

Claims

1. A coating with spectral selectivity comprising
 - a) a binder having a transmission of 60 % or more in the near-infrared wavelength range of 0.7 to 2.5 μm and a transmission of 40 % or more in the thermal infrared wavelength range;
 - b) first pigments which absorb 40 % or more of the visible light in the wavelength range of 0.35 to 0.7 μm , have a backscatter of 40 % or more in the near-infrared range of 0.7 to 2.5 μm and have an absorption of 60 % or less in the thermal infrared wavelength range;
 - c) second pigments having a backscatter and/or reflection of 40 % or more in the thermal infrared wavelength range.
2. A coating with spectral selectivity according to claim 1, characterised in that
 - a) the binder has a transmission of 75 % or more in the near-infrared wavelength range of 0.7 to 2.5 μm and a transmission of 50 % or more in the thermal infrared wavelength range;
 - b) the first pigments absorb 60 % or more of the visible light in the wavelength range of 0.35 to 0.7, have a backscatter or 50 % or more in the near-infrared range of 0.7 to 2.5 μm and have an absorption of 50 % or less in the thermal infrared wavelength range; and
 - c) the second pigments have a backscatter and/or reflection of 50 % or more in the thermal infrared wavelength.
3. A coating with spectral selectivity according to claim 1 or 2, characterised in that the binder is selected from at least one of the following groups:

- a) aqueous dispersions and emulsions on the basis of acrylates, styrene acrylate, polyethylene, polyethylene oxidate, ethylene acrylic acid copolymer, methacrylate, vinyl pyrrolidone vinyl acetate copolymers, polyvinyl pyrrolidone, polyisopropyl acrylate, polyurethanes, terpene and rosin resins;
 - b) binders containing solvents, comprising acryl, cyclised and butyl rubber, hydrocarbon resins, terpene resins, nitro, acetyl and ethyl cellulose, α -methyl styrene acrylonitrile copolymers, polyester imide, acrylic acid butyl esters, poly(meth)acrylic acid esters, polyurethanes, aliphatic polyurethanes, chlorosulfonated polyethylene and
 - c) thermoplastic materials such as polyolefins and polyvinyl compounds, especially polyethylene, polypropylene, Teflon®, polyamide.
4. A coating with spectral selectivity according to at least one of the previous claims, characterised in that the first pigments are selected from at least one of the following groups:
- a) inorganic pigments, selected from lead compounds, zinc, iron, chromium, cadmium, barium, titanium, cobalt, aluminium and silicon compounds, especially red iron oxides, chrome oxide green, chrome oxide hydrate, ultra marine blue and iron cyanide blue;
 - b) organic pigments, comprising natural dyes of animal and plant origin as well as synthetic organic dyes and pigments, especially monoazo pigments, diazo pigments, indigo pigments, perylenes, quinacridones, dioxazines, metal-free phthalocyanines, especially phthalocyanine pigment blue.
5. A coating having spectral selectivity according to at least one of the previous claims, characterised in that the first pigments are transparent or translucent pigments, especially transparent iron oxides and transparent organic pigments.

6. A coating having spectral selectivity according to at least one of the previous claims, characterised in that the second pigments are platelet-shaped and are selected from at least one of the following groups:
 - a) metal and/or metal alloys, selected from aluminium, aluminium bronze, antimony, chromium, iron, gold, iridium, copper, magnesium, molybdenum, nickel, palladium, platinum, silver, tantalum, bismuth, tungsten, zinc, tin, bronze, brass, nickel silver, a nickel/chromium alloy, niccolite, constantan, manganin and steel;
 - b) electrically non-conducting materials coated and/or covered with metal or metal alloys, said metals being selected from aluminium, aluminium bronze, antimony, chromium, iron, gold, iridium, copper, magnesium, molybdenum, nickel, palladium, platinum, silver, tantalum, bismuth, tungsten, zinc, tin, bronze, brass, nickel silver, a nickel/chromium alloy, niccolite, constantan, manganin, steel or electrically conducting stannous oxide;
 - c) laminated pigments composed of at least three layers, the middle layer having a smaller refractive index than the outer layers and the materials thereof being selected from the group of materials having a transmission of $\geq 20\%$, preferably $\geq 40\%$ in the wavelength range of 5 to 25 μm .

7. A coating with spectral selectivity according to at least one of the claims 1, 2 and 6, characterised in that the second pigments are surface-treated, platelet-shaped metal pigments, the surfaces of which have been treated in such a manner that they absorb more than 40 %, preferably more than 60 % of the visible light in the wavelength range of 0.35 to 0.7, have a reflection of more than 50 %, preferably more than 60 % in the near-infrared range of 0.7 to 2.5 μm and have a reflection of more than 40 %, preferably more than 50 % in the thermal infrared wavelength range.

8. A coating having spectral selectivity according to at least one of the claims 1 to 5, characterised in that the second pigments are approximately spherical and are substantially single crystals, the mean diameter d of the single crystals being determined by the formula

$$d = 14 \mu\text{m} / 2.1 \cdot (n_{T\ 14} - n_{B\ 14}),$$

wherein $n_{T\ 14}$ is the refractive index of the spherical particle at a wavelength of $14 \mu\text{m}$ and $n_{B\ 14}$ is the refractive index of the binder at a wavelength of $14 \mu\text{m}$.

9. A coating with spectral selectivity according to claim 1 or 2, characterised in that the second pigments are selected from the group consisting of metal sulfides, metal selenides, metal fluorides, metal carbonates, metal antimonites, metal oxides, barium titanate, barium ferrite, calcium sulfate, barium sulfate and of mixed crystals of said substances, especially mixed crystals of barium sulfate with zinc sulfide.
10. A coating with spectral selectivity according to claim 1 or 2, characterised in that the second pigments are hollow spheres having a diameter of 10 to $100 \mu\text{m}$, preferably 10 to $30 \mu\text{m}$, the wall of which consists of at least one material selected from acrylate, styrene acrylate, acrylonitril copolymer, polyethylene, polyethylene oxidate, chlorosulfonated polyethylene, ethylene acrylic acid copolymer, methacrylate, vinyl pyrrolidone vinyl acetate copolymer, vinylidene chloride copolymer, polyvinyl pyrrolidone, polyisopropyl acrylate, polyurethane, from cyclised rubber, butyl rubber, hydrocarbon resin, α -methyl styrene acrylonitrile copolymer, polyester imide, acrylic acid butyl ester, polyacrylic acid ester.
11. A coating with spectral selectivity according to at least one of the claims 1, 2, 8, 9 and 10, characterised in that the second pigments are a mixture of single crystals and hollow spheres.
12. A coating with spectral selectivity according to at least one of the claims 1, 2, 6 and 7, characterised in that the second platelet-shaped

pigments in the binder are aligned in such a manner that they form an angle of 30° to 60° to the normal line of the surface.

13. A coating with spectral selectivity according to claim 1 or 2, characterised in that additional pigments are used to achieve a matting effect, said additional pigments having a transmission of 40 % or more, preferably 50 % or more in the thermal infrared wavelength range and being approximately spherical and substantially being single crystals, the mean diameter d of the single crystal being determined by the formula

$$d = \lambda / 2.1 \cdot (n_T - n_B),$$

wherein n_T is the refractive index of the spherical particle at the wavelength λ , n_B is the refractive index of the binder at a wavelength of λ and λ is a wavelength in the range of visible light.

14. A coating with spectral selectivity according to at least one of the claims 1, 2 and 13, characterised in that the additional pigments are selected from the group of metal sulfides, metal selenides, fluorides, carbonates, antimonides, metal oxides, barium titanate, barium ferrite, calcium sulfate, barium sulfate and from mixed crystals of representatives of the groups enumerated, especially mixed crystals of barium sulfate with zinc sulfide.
15. A coating with spectral selectivity according to claim 1 or 2, characterised in that opaque polymer pigments and/or organic pigments are used as additional pigments for matting purposes, said pigments having a transmission of 30 % or more, preferably 40 % or more in the thermal infrared wavelength range, having and/or forming a cavity in the dry state and the size of the polymeric or organic pigments being selected in such a manner that their mean diameter is 0.2 to 2.0 μm , preferably 0.4 to 0.8 μm .
16. A coating with spectral selectivity according to claim 1 or 2, characterised in that transparent red, green and blue pigments are used in addition to the first pigments.

17. The use of a coating with spectral selectivity according to at least one of the previous claims as a coating for deposit surfaces (ledge) in motor vehicles.

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